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nearly every accredited high school is now using the compound microscope in the study of plants selected as types of all the greater groups of the vegetable kingdom. We may be permitted to remark, also, that in practice it will be found impossible to secure in nine-tenths of the secondary schools, much of the material suggested by the author for study. In many chapters the teacher may readily make substitutions, but in those relating to epiphytes, parasites, saprophytes and insectivorous plants, this difficulty will prove quite embarrassing.

—CHARLES E. BESSEY.

ZOOLOGY.

The orientation of organisms by light.[1]—The problem that the author undertakes to solve is whether the migration of organisms towards or from a source of light is due to differences in intensity or to the direction of the rays. According to Strasburger, whose views have been more or less generally accepted, the determinant factor is the direction of the rays. His conclusions drawn from experiments with swarm spores of Botrydium and Bayopsis (78) were later (90) confirmed by Loeb in experiments with the larvæ of *Porthesia chrysorrhœa.* But this view of the subject has been opposed by Oltmann (92) as the result of certain experiments performed with *Volvox minor* and *globator;* and Oltman has been supported by Verworn (94).

Davenport and Cannon criticise Oltman's management of his apparatus and themselves attack the problem with what is essentially the method of Strasburger, but use Daphnia instead of plants. A small glass trough was painted dead black inside and out and placed on a table at a distance, at its nearest end, of 51 cm. and of 66.5 cm. at its further end, from the light of a gas lamp having a Welsbach burner which was raised 31 cm. above the table. A wedge shaped box with glass bottom and filled with India ink solution served, when needed, as a screen, the thicker portion of the wedge being placed nearest the source of the rays.

Experiments without the screen showed that the Daphniæ when introduced at the end of the trough farthest from the source of light invariably moved towards the light. When the screen was interposed and all other light than that from the lamp excluded the same result was obtained. They were introduced into the trough at its middle point, still the result was the same. Of 39 individuals introduced at the end of the trough most distant from the light 54 per cent. passed the middle line towards the light, 43 per cent made the entire trip of the length of the trough. Only one of the 39 remained at the starting point.

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[1] C. B. Davenport and W. B. Cannon. On the Determination of the Direction and Rate of movement of organisms by Light. Reprint from Journ. Phys. XXI, 22–32. From Dr. C. B. Davenport.

When introduced at the middle of the trough 57 per cent. of 58 Daphniæ made the entire trip in two minutes. In all 67 per cent. moved towards the light, 12 remained at the starting point and three of these were caught in floating bubbles, 6 individuals, or the remainder, moved away from the light. But these scarcely affect the general result.

From the difference in the distances of the two ends of the trough from the source of the light the authors calculate that the difference in the intensity of the light at the two ends of a Daphnia .1 mm. long exposed to the unobstructed rays is somewhere between .0027 and .0031 of the intensity of the light at one end of its body. But when the screen is used the difference at the thicker end of the wedge will be as great as .0034 of the intensity at one end of the Daphnia and will increase to about 17 per cent. at the edge of the wedge. Consequently, in as much as the decrease in intensity an account of the increasing thickness of the screen is greater than the increase due to greater proximity of the light the authors conclude that the effect of variations in the intensity of the light must be ruled out of court leaving as the only possible cause of the movements of the animals the direction of the light rays. The difference of opinion, it is pointed out, has been due to a failure to distinguish between phototaxis, or the response to the direction of rays, and photopathy, or the response to variations in intensity.

The relation between intensity of light and rapidity of movement.—In the same paper these authors just mentioned endeavor to answer the question, "Do positively phototactic organisms move more rapidly toward their optimum intensity of light than toward an intensity below the optimum?"

The method by which the authors attacked this problem was similar to the one just mentioned. The trough was similarly placed at a horizontal distance of 50 cm. from the burner. In order to guage the intensity of the light an index was attached to the gas cock so that one-fourth and full light could be obtained immediately without the use of a photometer for each experiment. Diffuse light was cut off from the trough by placing this in a second trough with high walls.

The Daphinæ were introduced one at a time at the end of the trough most distant from the light and the time noted when they passed a point 2 cm. from the end of the trough, and again when they passed another point two centimeters distant from the other end. The difference then equalled the time of the trip.

Six series of experiments were performed which were divided into two groups. In the first group there was an alternation from full light to one-fourth light to full light again, and in the second group, from one-fourth to full to one-fourth light.

The distance travelled was 16 cm. The mean times in seconds found in the three series of the first group was 48 (full light), 57, (¼ light), and 31 (full light). In the second group it was 36 (¼ light), 28 (full light), and 30.5 (¼ light). The average time for the full light was 35.7 and for ¼ light 41.2, or expressed as a ratio of the former to the latter the time was 87 : 100.

Sixty trips made in the order of the averages just given in experiments with several individuals changed the ratio to 84 : 100.

The Diaphniæ acted differently when first put in the trough. In full light they started immediately, but in one-fourth light they evinced hesitating movements. This together with the absence of any close relation between the diminished intensity of light and the longer time required for migration in such light than in full light as shown in the averages obtained the authors conclude, and it seems justly, that the longer time required to migrate in the smaller amount of light is due not so much to the lower intensity as to diminished precision in orientation. And this leads to the further conclusion already reached in other experiments that light acts chiefly through the direction of its rays.

The authors' results bear out the conclusions of Nägeli (78) and of Strasburger, who says that the course of swarm spores is straightest in those areas that are brighest, as well as those of Loeb, who asserts that "the orientation of an animal in the direction of the rays is the more precise as the intensity increases."

The table of figures showing the time of the several trips brings out a further fact, namely, that the rate of movement increases with each succeeding trip made by the same animal. The succession averages for full light were 48, 31, and 28 seconds, and those for one-fourth light, 57, 36, and 30.5 seconds. The cause of this increase of speed the authors say they must leave undetermined, but it would seem from common experience that it may have been and probably was due to the animals' experience with the circumstances in which it was placed.—F. C. KENYON.

A List of the Birds of the Vicinity of West Chester, Chester Co., Pennsylvania.—The following list of birds is based upon the observations of a collecting period extending from 1885 to 1891, and again resumed in 1895. By far the greater part of my collecting has been limited to the country within a five miles' radius of the town of West Chester, that is, principally to the higher ground of the townships of West and East Goshen and West Whiteland to the north and east, and to the west and south the valley of the Brandywine Creek in East Bradford townships. All the species here annotated have been shot and identified by myself, with the exception of a few taken by collecting friends; but none are included in this list of which I have not seen specimens in the flesh. For a considerable number of the migratory species I have made notes on the time of their first occurrence in the spring, as well as of the time of arrival of the " bulk " of individuals for the given year, and for some species I have noted the time of arrival or departure in the fall. Many of these dates will be found to correspond very closely with those given by Witmer Stone in his " Birds of Eastern Pennsylvania and New Jersey," 1894. Further, I have endeavored to note the comparative abundance of the species as accurately as possible, and in this point my data would offer approximate correctness, since the area over which I have collected is comparatively limited in extent.

The rarest of the 145 species mentioned below are the following: *Aegialitis semipalmata* Bonap., *Ectopistes migratorius* (Linn.), *Zonotrichia leucophrys* (Forst.), *Lanius ludovicianus* Linn. and *Dendroica caerulea* (Wils.).

1. *Polilymbus podiceps* (Linn.), Pied-billed Grebe. A not infrequent migrant in the fall, along the Brandywine.

2. *Sterna* sp., Tern. I saw an individual of a small species of this genus (perhaps *S. hirundo* Linn.) shot on the Brandywine near Lenape, in the late summer of 1887. Owing to the rapid decomposition of the specimen, I was unable to identify the species.

3. *Anas discors* Linn., Blue-winged Teal. On Aug. 8, 1889, I shot an adult, and at the same time saw another individual, on the Brandywine near Lenape.

4. *Aix sponsa* (Linn.), Wood Duck. An infrequent summer resident on the Brandywine.

5. *Erismatura rubida* (Wils.), Ruddy Duck. I shot an adult female, March 15, 1890, in a marsh by the Brandywine at Lenape.

(In addition to the three species of duck here mentioned, I have seen two or three others, which I was unable to secure and identify.)

6. *Branta canadensis* (Linn.), Canada Goose. This species regularly migrates over our district in the spring, fall and winter.

7. *Botaurus lentiginosos* (Montag.), American Bittern. Rare; I have seen only two individuals, Aug. 3, 1887, and May, 1895, respectively. Both of these I saw very closely, so that there was no possibility of a confusion with the Night Heron.

8. *Ardea herodias* Linn., Great Blue Heron. An infrequent summer resident, becoming rarer each year. I noticed a pair during two summers in East Bradford, and have observed a few in the spring.

9. *A. virescens* Linn., Green Heron. Common summer resident.

(I have never found the Night Heron, *Nycticorax nycticoryx naevius* (Bodd.), in this neighborhood, though I have seen it frequently in adjoining parts of Delaware Co.).

10. *Porzana* sp., Rail. I picked up a badly decomposed specimen of this genus on a country road in late summer—*P. carolina* (Linn.)?

11. *Philohela minor* (Gmel.). American Woodcock. Infrequent migrant during the early spring and late fall.

12. *Gallinago delicata* (Ord.), Wilson's Snipe. A common migrant in the early spring (March 16 to April 25) and late fall, in the marshes along the Brandywine. It is to be found only occasionally in higher localities (West Goshen).

13. *Totanus solitarius* (Wils.), Solitary Sandpiper. This species is a regular migrant in the late spring, when it is often found in flocks of considerable size. Though I have never seen it in the fall, I have shot one specimen and seen others in the summer, so that it is quite probable that it sometimes breeds here.

14. *Bartramia longicauda* (Bechst.), Bartramian Sandpiper. Common summer resident in the higher parts of West Whiteland township, but I have never met with it elsewhere.

15. *Actitis macularia* (Linn.), Spotted Sandpiper. Common summer resident, mainly along the larger streams.

16. *Aegialitis semipalmata* Bonap., Semipalmated Plover. I shot two adult individuals in West Goshen, Sept. 12, 1888. These are, I believe, the only specimens taken in this county.

17. *Ae. vocifera* (Linn.), Killdeer. Common summer resident; arrives in the spring between March 2d and March 16th.

18. *Colinus virginianus* (Linn.), Bob-white. Infrequent resident in this vicinity, though it was more abundant ten years ago.

19. *Bonasa umbellus* (Linn.), Ruffed Grouse. I saw one May 10, 1890, in a thicket, a mile north of West Chester.

20. *Ectopistes migratorius* (Linn.), Passenger Pigeon. I shot one individual of this, now very rare, species, Sept. 1, 1886, in Birmingham township, and a female in West Goshen, Sept. 9, 1887. Both specimens were in immature plumage, and are now in the collection of the Acad. Nat. Sci., Philadelphia. I believe these to have been the last specimens taken in eastern Pennsylvania.

21. *Zenaidura macrura* (Linn.), Mourning Dove. Abundant summer resident. (Earliest arrivals: March 16, 1885; Feb. 22, 1886; March 3, 1887; March 24, 1888; March 14, 1889. Bulk arrived: March 26, 1886; March 30, 1887; March 31, 1888; March 29, 1889).

22. *Cathares aura* (Linn.), Turkey Vulture. Common through the spring, summer and fall; in mild winters a few are to be seen.

23. *Circus hudsonius* (Linn.), Marsh Hawk. Infrequent summer resident.

24. *Accipiter velox* (Wils.), Sharp-shinned Hawk. Infrequent; I have observed it only in the fall, winter and spring.

25. *A. cooperi* (Bonap.), Cooper's Hawk. Rather infrequent resident.

26. *Buteo borealis* (Gmel.), Red-tailed Hawk. Common resident; more abundant than any other hawk.

27. *B. lattisimus* (Wils.), Broad-winged Hawk. I shot an adult male in West Goshen, April 22, 1891.

28. *Falco peregrinus anatum* (Bonap.), Duck Hawk. I saw a specimen in the flesh, shot in East Bradford, Feb. 14, 1886. This specimen is now in the collection of Geo. W. Roberts, Esq., West Chester.

29. *F. columbarius* Linn. My brother shot a male in West Goshen, Oct. 25, 1885.

30. *F. sparvarius* Linn., American Sparrow Hawk. Common resident, though not remaining through severe winters.

31. *Pandion haliœetus carolinensis* (Gmel.), American Osprey. Infrequent; I have noticed a pair on several occasions during the summer of 1888, along the Brandywine (East Bradford). This pair might have been breeding in this vicinity. Is it not probable that many of those seen in this county have crossed over from New Jersey? (Earliest spring date, April 4, 1888).

32. *Asio acciptrinus* (Pall.), Short-eared Owl. A not infrequent visitant in the winter and early spring. I have never seen it in the fall. During some years it is more abundant than in others. I have

met with it on the following occasions: Feb. 17 to April 13, 1888; April 6, 1890; Jan. 8 to March 13, 1891.

33. *Megascops asio* (Linn.), Screech Owl. Common resident.

34. *Nystea nyctea* (Linn.), Snowy Owl. A few are seen or shot every severe winter, and I have seen such specimens in the flesh.

35. *Coccyzus americanus* (Linn.), Yellow-billed Cuckoo. Common summer resident. Arrives about the third week in May.

36. *C. erythrophthalmus* (Wils.), Black-billed Cuckoo. Summer resident, less abundant than the preceding.

37. *Ceryle alcyon* (Linn.), Belted Kingfisher. Common summer resident, remaining until about December. Arrives in the spring between March 15 and April 6.

38. *Dryobates villosus* (Linn.), Hairy Woodpecker. Infrequent in the fall, winter and early spring. I have never observed more than three or four in any one year. (Earliest fall occurrence: Sept. 10, 1887; latest spring occurrence: April 14, 1889).

39. *D. pubescens* (Linn.), Downy Woodpecker. Common resident.

40. *Sphyrapicus varius* (Linn.), Yellow-bellied Sapsucker. Rather common, though somewhat irregular, migrant in the spring (April) and fall (Sept. 28 to Nov. 21).

41. *Melanerpes erythrocephalus* (Linn.), Red-headed Woodpecker. Common summer resident, especially in the valley of the Brandywine; much less abundant on higher ground. (Earliest arrivals: March 11, 1886; April 28, 1891).

42. *Colaptes auratus* (Linn.), Flicker. Common summer resident, the most abundant representative of the family, with the possible exception of the Downy Woodpecker. (Earliest spring arrivals: March 7, 1886; March 23, 1887; March 24, 1888; March 27, 1889. Bulk arrived: April 3, 1886; April 10, 1887; March 31, 1888; March 31, 1889; April 15, 1891). One was seen by me Dec. 22, 1885.

43. *Antrostomus vociferus* (Wils.), Whip-poor-will. I heard one very plainly on April 27, 1891, in West Goshen township.

44. *Chordeiles virginianus* (Gmel.), Nighthawk. Rather common summer resident in certain dry and rocky localities, as, e.g., the "Barrens" in West Goshen. (Earliest spring arrivals: March 15, 1886; May 3, 1887; May 9, 1888; May 3, 1890. Bulk arrived: May 11, 1886; May 19, 1887. Remains in the fall until nearly October).

45. *Chaetura pelagica* (Linn.), Chimney Swift. Abundant summer resident. (Earliest spring arrivals: April 16, 1887; April 7, 1888; April 19, 1889: April 13, 1891. Bulk arrived: April 24, 1886; April 30, 1887; April 25, 1891. Leaves in the fall before Oct. 10).

46. *Trochilus colubris* Linn., Ruby-throated Humming-bird. Rather common summer resident. (Earliest spring arrivals: April 14, 1886; May 9, 1887; May 17, 1888; May 2, 1897).

47. *Tyrannus tyrannus* (Linn.), Kingbird. Common summer resident. (Earliest spring arrivals: April 2, 1885; April 7, 1886; May 4, 1887. Bulk arrived: May 5, 1887; May 9, 1888).

48. *Myiarchus crinitus* (Linn.), Crested Flycatcher. Common summer resident, though not as abundant as the preceding. (Earliest spring arrival: May 3, 1890. Bulk arrived: May 7, 1887).

49. *Sayornis phoebe* (Lath.), Pewee. Abundant summer resident. It arrives in the spring much earlier than the other flycatchers. (Earliest spring arrivals: March 29, 1886; March 27, 1887; March 23, 1889; March 16, 1890; April 8, 1891; March 23, 1895. Bulk arrived: April 3, 1886; April 21, 1887).

50. *Contopus virens* (Linn.), Wood Pewee. Abundant summer resident, more numerous than the preceding species. (Earliest spring arrivals: April 17, 1886; April 28, 1891. Bulk arrived: May 7, 1887).

51. *Empidonax flaviventris* Baird, Yellow-bellied Flycatcher. Infrequent if not rare migrant in the fall. I have secured only three or four specimens, but have seen others in the collections of local ornithologists.

52. *E. virescens* (Vieill), Acadian Flycatcher. An infrequent migrant in the spring.

53. *E. minimus* Baird, Least Flycatcher. Infrequent migrant. I shot three specimens and saw another in the month of May (1890, 1891), but have never seen it in the fall.

54. *Cyanocitta cristata* (Linn.), Blue Jay. Common resident in thick woods along the Brandywine, less frequent in higher localities. In the winter it is also found in the open country.

55. *Corvus americanus* Aud., American Crow. Abundant resident, though some appear to migrate in severe winters.

56. *Dolichonyx oryzivorus* (Linn.), Bobolink. Common, occasionally even abundant, migrant in the spring and fall. In the former season it is found almost exclusively along the Brandywine, but in the fall is frequently met with also in the uplands, in clover fields. (I have the following notes on its occurrence. Spring: May 11–20, 1896; May 5–17, 1887; fall: Aug. 4–29, 1886; Aug. 8, 1889; Sept. 25, 1890).

57. *Molothrus ater* (Bodd.), Cowbird. Abundant summer resident. (Earliest spring arrivals: March 13, 1887; March 14, 1889; March 15, 1891. Bulk arrived: March 24, 1887; April 4, 1888; March 23, 1889).

58. *Agelaius phœniceus* (Linn.), Red-winged Blackbird. Abundant summer resident. (Earliest spring arrivals: March 8, 1887; February 22, 1888; March 12, 1889. Bulk arrived: March 13, 1887; March 17, 1888; March 23, 1889).

59. *Sturnella magna* (Linn.), Meadow Lark. Abundant resident. During mild winters large numbers may be found in sheltered valleys, while in severe winters, as was 1895, few are to be seen. I can corroborate the fact noticed by other observers that this species in the cold season always migrates, to a certain extent, by leaving the higher ground to collect in the valleys.

60. *Icterus spurius* (Linn.), Orchard Oriole. Rather common summer resident, but less abundant than the following species. (Earliest spring arrivals: May 4, 1887; May 3, 1890. Bulk arrived: May 7, 1886; May 5, 1887; May 6, 1888).

61. *I. galbula* (Linn.), Baltimore Oriole. Common summer resident. (Earliest spring arrivals: May 5, 1886; May 1, 1887; April 29, 1888; May 9, 1891. Bulk arrived: May 7, 1886; May 4, 1887).

62. *Scolecophagus carolinus* (Müll.), Rusty Blackbird. Saw a single individual, Nov. 22, 1896.

63. *Quiscalus quiscula* (Linn.), Purple Grackle. Abundant summer resident. (Earliest spring arrivals: Jan. 2, Feb. 10, 1887; Feb. 20, 1888; March 2, 1889; Jan. 29, 1890; Feb. 2, 1891. Bulk arrived: March 8, 1887; Feb. 26, 1888; March 1, 1890; Feb. 24, 1891. Latest occurrences in the fall: Nov. 25, 1887; Dec. 20, 1889).

64. *Q. quiscula æneus* (Ridgw.), Bronzed Grackle. I have a single specimen in my collection, taken in East Bradford, April 30, 1889.

65. *Carpodacus purpureus* (Gmel.), Purple Finch. I have personally observed this bird only in the year 1887, when I saw a number of small flocks from April 26th to May 9th. According to West Chester papers, they were observed also in the following spring. It would seem to be an irregular spring migrant in this locality.

66. *Loxia curvirostra minor* (Brehm.), American Crossbill. Infrequent winter resident. I have found it on only two occasions, but Mr. Josiah Hoopes has collected it quite frequently in the Hoopes' Nurseries, West Goshen.

67. *Acanthis linaria* (Linn.), Redpoll. Irregular visitant in exceptionally cold winters. I have seen it only once, on March 24, 1888, when I noticed a flock of about a dozen.

68. *Spinus tristis* (Linn.), American Goldfinch. Abundant resident, though large numbers migrate in severe winters.

69. *S. pinus* (Wils.), Pine Siskin. Irregular winter visitant. I have seen it twice, a single individual, on Feb. 5, 1888, and a small flock on

the 22d of the same month. I also noticed a flock of about 30 in our apple orchard, from April 28 to May 7, 1897, and shot several individuals.

70. *Poocaetes gramineus* (Gmel.), Vesper Sparrow. Abundant summer resident. (Earliest spring arrivals: April 5, 1887; March 31, 1888; March 28, 1889; April 13, 1891; March 29, 1895. Bulk arrived: April 6, 1887; April 1, 1888; April 4, 1889; April 19, 1890).

71. *Ammodramus sandvichensis savanna* (Wils.), Savanna Sparrow. Abundant migrant in the spring and fall. (Spring occurrences noted: April 8–13, 1886, March 28, 1889; April 19, 1890; April 18 to May 9, 1891).

(*To be continued.*)

On the Use of the Terms Heredity and Variability.—Recent discussions of various biologic phases of evolution have become so refined that our attention must be more critically given to the exact meaning which each writer gives to the terms he uses. Each author, having some special point to emphasize, gives his own particular definition to common terms, and so makes a direct comparison of his propositions with those of other writers impossible. A great deal of time-patience-consuming controversy finds room in mere quibbles of words without essential disagreement of ideas. Even the terms "heredity" and "variability," standing for the very foundation blocks of evolution, suffer seriously from this duplicity of definition.

It has long seemed to the present writer that considerable polemic friction could be avoided without a re-definition of these two important terms if the relationship of the two notions were more accurately and generally apprehended. Heredity and variability are so commonly placed in antithesis that we unconsciously assume that they express qualitative differences. But they do not. In relation to each other their significance is purely quantitive. In the quantitive scale they designate supplements. If one race manifests variability more than another it manifests heredity by so much less. If variability increases in a variety heredity wanes. If the inheritance of likenesses becomes more marked we say that variation is growing less; our variety is becoming "fixed." Thus heredity and variability really stand to each other as heat and cold,—as positive and negative. And a perfectly accurate nomenclature could dispense with one or the other. But while both terms are still conveniently retained, as are the terms heat and cold, it is extremely desirable that their unity of application be observed.

If this complimentary nature of heredity and variability were more keenly appreciated many evolutionary misunderstandings would be forestalled at their very beginnings. Thus it has been usual for philosophers, like Lamarck, Nägeli and Eimer, to assume that the exact reproduction of likeness was the original characteristic of organic reproduction, and that variability is an anomaly to be accounted for. This is now met by Bailey's contra-assumption that unlikeness marks all unsophisticated reproduction, and that "heredity is an acquired character." Both are equally assumptions and equally gratuitous. What we actually *know* is that among different races the average degree of likeness between successive generations differs. We also know that the degree of likeness fluctuates from generation to generation in the same race. We do not know of such a thing as absolute likeness, nor do we know the complete absence of heredity. The only thing that we do know is that similarity begets similarity. That like begets like, or unlike begets unlike can be true only by a quibble of the terms.

In dealing with this subject in a very critical class of students we have so much felt the need of more precise nomenclature that I have given the name of the allophysical law to the formula "similarity begets similarity." Heredity is then retained in its absolute sense (the sense in which it is actually most used) as a convenient zero-point from which to measure variability. But the normal cause of reproduction is not conceived to be the repetition of exact likenesses, nor of total unlikenesses, but is understood to follow the allophysical law.—F. A. WAUGH.

Zoological News.—According to Mr. E. H. L. Schwartz, Spirula is in its anatomy closely related to Sepia. As to its descent the author finds that it has been derived from the Belemnites through Spirulirostra, thus reversing the process set forth in an authoritative article recently published. Mr. Schwartz bases his conclusions upon the study of sections of the shell passing through all the whorls in the plane of coiling, whereby the structure of the walls and septa are well exposed. (Journ. Marine Zool. and Micros., Vol. II, No. 6.)

Nineteen species and subspecies of Voles are recognized by Mr. Bailey as inhabiting Canada and the United States. Of these, five are described as new. Concerning the habits of these animals the author states that they do not hibernate in winter, nor has he ever found evidence of their storing provision. They make long tunnels under the snow, through which they travel about in safety while they procure the tender grass blades and ripe seeds as easily from the surface of the ground as when the white blanket is not above them. (Proceeds. Biol. Soc. Washington, Vol. XI, 1897.)

A late number of the Proceeds. Phila. Acad. contains an anatomical description of *Tarsius fuscus*, by Dr. Harrison Allen. The author describes the superficies, auricles, rugæ, bones and muscles and compares them with the account of the corresponding parts in the allied species *Tarsius tarsius* as given in Burmeister's monograph. Dr. Allen goes into some detail which is lacking in Burmeister's paper, notably full descriptions of the teeth, with figures; and notes on the mechanism of the limbs. (Proceeds., Phila., Acad., 1897.)

ENTOMOLOGY.[1]

Miss Ormerod's Report.—A perusal of Miss Ormerod's recent report on the injurious insects of Great Britain for 1896, shows that the insect pests on the other side of the Atlantic differ but little from their cousins here in their methods of attack. In fact, in many instances they are identical, portions of the report treating of the codlin moth (*Carpocapsa pomonella*), Asparagus beetle (*Crioceris asparagi*) and several other only too common American insects. There are numerous injurious insects, however, at present confined to the Old World, many of which in time are likely to gain foothold here, and against the introduction of which we cannot be too careful. Notice the devastation wrought by the common cabbage butterfly (*Pieris rapœ*) which in a few years after its introduction had spread from the Atlantic to the Pacific, and yet in England it is usually considered as of minor importance compared with its larger relative *Pieris brassicœ.* The gypsy moth is another example of the alarming spread of an insect in a new country when unchecked by its natural enemies. Hundreds of thousands of dollars have been spent by Massachusetts in an endeavor to eradicate it after it had gotten a strong foothold, all of which might have been saved had the attempt been made in time. And now according to the newspapers another undesirable emigrant has arrived on the scene in the form of the "brown tailed moth" and established itself in the very midst of the gypsy moth infested region in a strip a " mile long by half a mile wide" in which it has " stripped the most of the fruit and many of the shade trees." The insect from its life history would seem to be an easy enemy to fight and should it be as dangerous as reported will probably be stamped out with little trouble unless it has a greater range than was supposed. But if the few people who noticed it in pre-

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[1] Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.